FLEX QUICK GUIDE

FLEX - OVERVIEW

What is Flex?

- Flex is a powerful, open source application framework which allows to build traditional applications for browser, mobile and desktop using the same programming model, tool, and codebase.
- Flex provides FLEX SDK consisting of the Flex class library (ActionScript classes), the Flex compilers, the debugger, the MXML and ActionScript programming languages, and other utilities to build expressive and interactive rich internet applications (RIA)
- Flex takes care of the user interface (UI) or the client-side functionality of a web application. Server-side functionality dependent on server-side components written in a traditional scripting language (Java/ PHP etc.)
- A Flex based application actually delivered as a SWF file and it closely resembles the HTML / Javascript portion of a traditional web application.
- Flex application is deployed as SWF file(s) plus an HTML wrapper, the CSS file(s) and any server-side script files (i.e. Java, .CFM, .PHP, etc) to the server. Like traditional web applications
- These resources are delivered from the server to the client browser using the customary HTTP request / response fashion and Flash Player run the application in the browser.

Advantages of Flex

- Flex applications being Flash Player based can access device capabilities like GPS, camera, local database, graphics accelerometer.
- Flex applications can run on Andriod, BlackBerry Tablet OS, iOS devices.
- Flex applications can run on Browsers as well as on Desktop.
- Flex applications are platform independent. UI can be native to platform or can be made same on each platform.
- Flex applications can interact with server with all major server side technologies like Java, Spring, Hibernate, PHP, Ruby, .NET, Adobe ColdFusion, and SAP using industry standards such as REST, SOAP, JSON, JMS, and AMF.
- Flex Applications developed assures Rich User Experience through intuitive interaction with the application and presenting information in a visually richer interface.
- Flex application is a single page application where states can can transition from one state to other state without having to fetch a new page from the server or to refresh the browser.
- Flex application reduces the load on the server to great extent because it is only required return the application once, rather than a new page every time when the user changes views.

Disadvantages of Flex

- Flex applications are single threaded applications but Flex provides an asynchronous programming model to mitigate this concern.

- Flex is actionscript and XML based. Learning of these two is a must to work in Flex.

FLEX - ENVIRONMENT SETUP

Let us learn how to prepare a development environment to start your work with Adobe Flex Framework. This tutorial will also teach you how to setup JDK and Adobe Flash Builder on your machine before you setup Flex Framework:

System Requirement

FLEX requires JDK 1.4 or higher so the very first requirement is to have JDK installed in your machine.

JDK	1.4 or above.
Memory	no minimum requirement.
Disk Space	no minimum requirement.
Operating System	no minimum requirement.

Follow the given steps to setup your environment to start with Flex application development.

Step 1 - Verify Java installation on your machine

Now open console and execute the following **java** command.

OS	Task	Command
Windows	Open Command Console	c:\> java -version
Linux	Open Command Terminal	$ java -version
Mac	Open Terminal	machine:~ joseph$ java -version

Let's verify the output for all the operating systems:

OS	Generated Output
Windows	java version "1.6.0_21" Java(TM) SE Runtime Environment (build 1.6.0_21-b07) Java HotSpot(TM) Client VM (build 17.0-b17, mixed mode, sharing)
Linux	java version "1.6.0_21" Java(TM) SE Runtime Environment (build 1.6.0_21-b07) Java HotSpot(TM) Client VM (build 17.0-b17, mixed mode, sharing)
Mac	java version "1.6.0_21" Java(TM) SE Runtime Environment (build 1.6.0_21-b07) Java HotSpot(TM)64-Bit Server VM (build 17.0-b17, mixed mode, sharing)

Step 2 - Setup Java Development Kit (JDK):

If you do not have Java installed then you can install the Java Software Development Kit (SDK) from Oracle's Java site: Java SE Downloads. You will find instructions for installing JDK in downloaded files, follow the given instructions to install and configure the setup. Finally set PATH and JAVA_HOME environment variables to refer to the directory that contains java and javac, typically java_install_dir/bin and java_install_dir respectively.

Set the **JAVA_HOME** environment variable to point to the base directory location where Java is installed on your machine. For example

OS	Output
Windows	Set the environment variable JAVA_HOME to C:\Program Files\Java\jdk1.6.0_21
Linux	export JAVA_HOME=/usr/local/java-current
Mac	export JAVA_HOME=/Library/Java/Home

Append Java compiler location to System Path.

OS	Output
Windows	Append the string ;%JAVA_HOME%\bin to the end of the system variable, Path.
Linux	export PATH=$PATH:$JAVA_HOME/bin/
Mac	not required

Step 3 - Setup Adobe Flash Builder 4.5

All the examples in this tutorial have been written using Adobe Flash Builder 4.5 Profession IDE Trial Version. So I would suggest you should have latest version of Adobe Flash Builder installed on your machine based on your operating system.

To install Adobe Flash Builder IDE, download the latest Adobe Flash Builder binaries from http://www.adobe.com/in/products/flash-builder.html. Once you downloaded the installation, unpack the binary distribution into a convenient location. For example in C:\flash-builder on windows, or /usr/local/flash-builder on Linux/Unix and finally set PATH variable appropriately.

Flash Builder can be started by executing the following commands on windows machine, or you can simply double click on FlashBuilder.exe

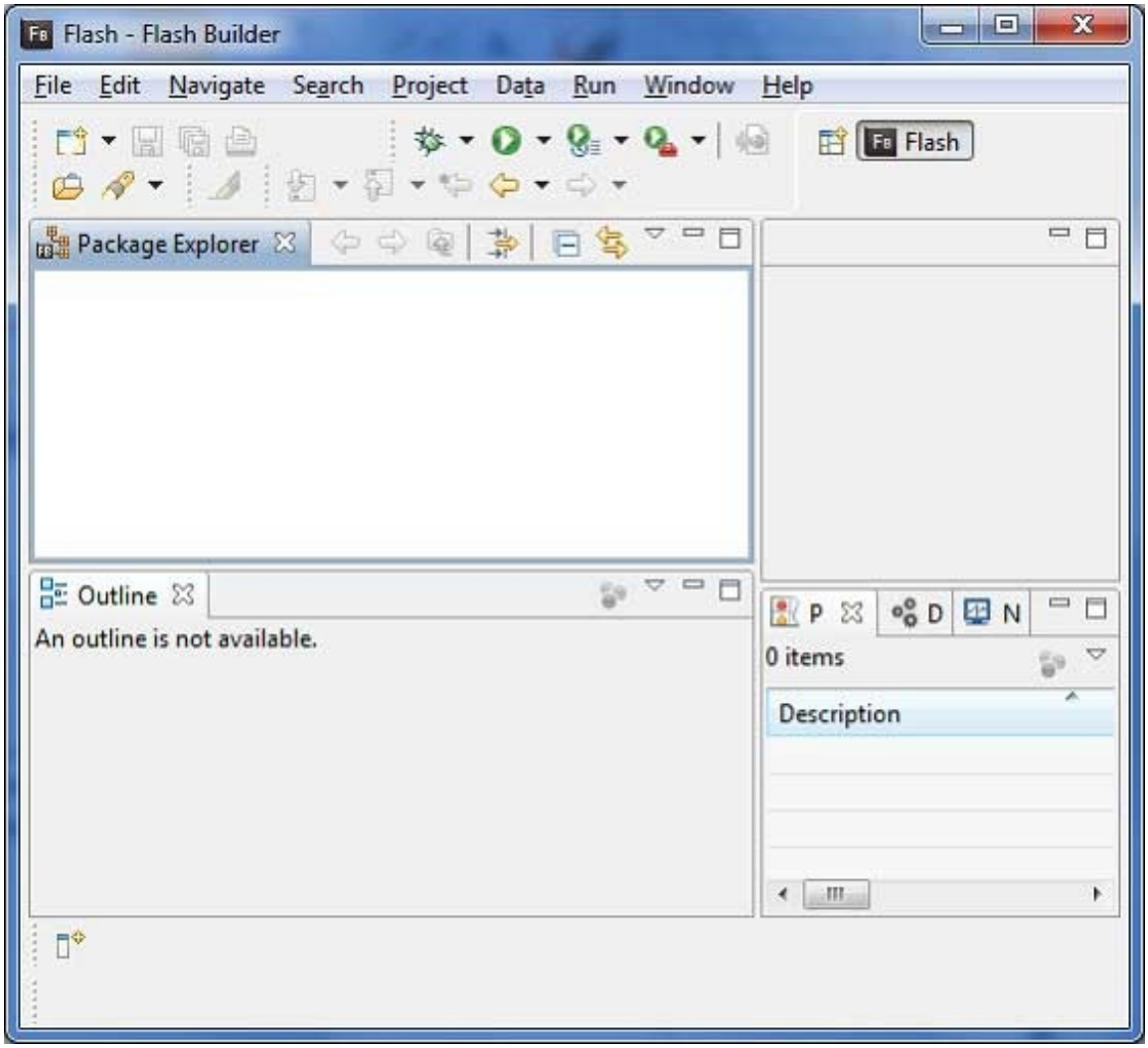
```
%C:\flash-builder\FlashBuilder.exe
```

Flash Builder can be started by executing the following commands on Unix (Solaris, Linux, etc.) machine:

```
$/usr/local/flash-builder/FlashBuilder
```

Adobe Flash Builder Trial Version can be used for 60 days. Just accept the terms and conditions and skip the initial registration steps and continue with the IDE. We're using the trial version for teaching purpose.

After a successful startup, if everything is fine then it should display following result:



Adobe Flash Builder comes pre-configured with FLEX SDKs. We're using FLEX SDK 4.5 in our examples which comes bundled with Adobe Flash Builder 4.5.

Step 4: Setup Apache Tomcat:

You can download the latest version of Tomcat from http://tomcat.apache.org/. Once you downloaded the installation, unpack the binary distribution into a convenient location. For example in C:\apache-tomcat-6.0.33 on windows, or /usr/local/apache-tomcat-6.0.33 on Linux/Unix and set CATALINA_HOME environment variable pointing to the installation locations.

Tomcat can be started by executing the following commands on windows machine, or you can simply double click on startup.bat

```
%CATALINA_HOME%\bin\startup.bat

or

C:\apache-tomcat-6.0.33\bin\startup.bat
```

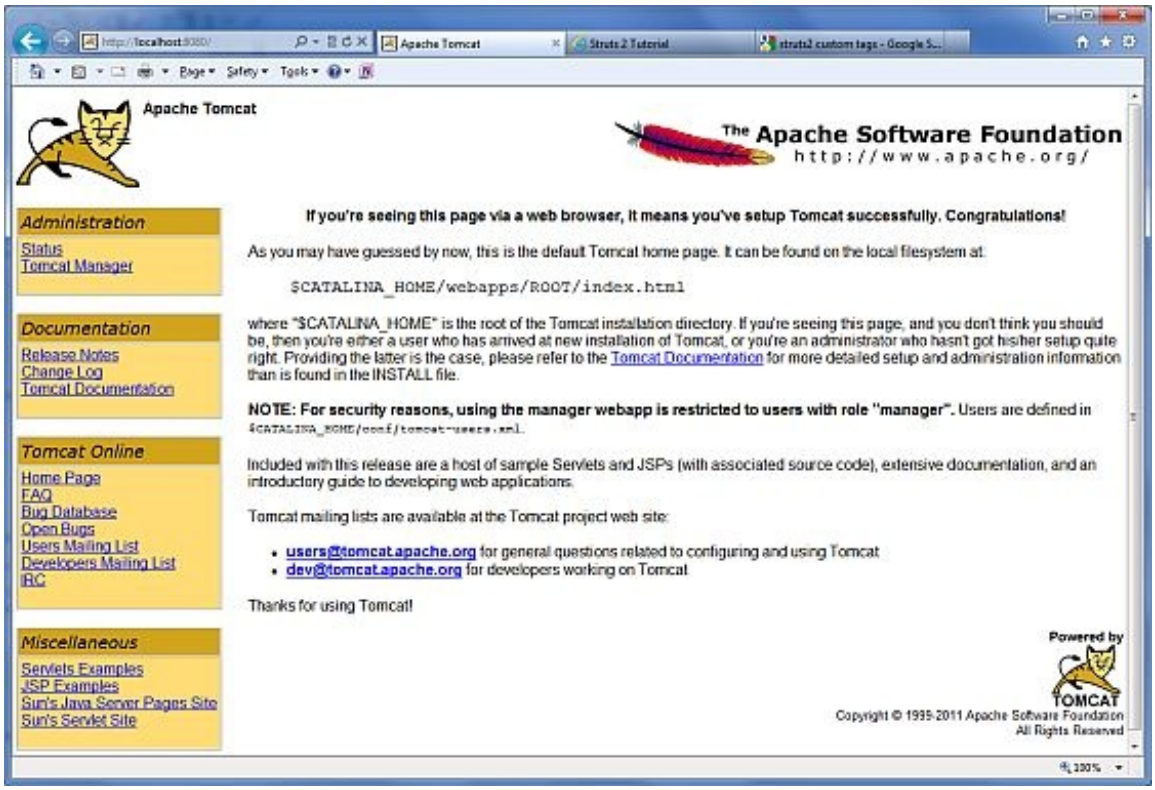
Tomcat can be started by executing the following commands on Unix (Solaris, Linux, etc.) machine:

```
$CATALINA_HOME/bin/startup.sh

or

/usr/local/apache-tomcat-6.0.33/bin/startup.sh
```

After a successful startup, the default web applications included with Tomcat will be available by visiting **http://localhost:8080/**. If everything is fine then it should display following result:



Further information about configuring and running Tomcat can be found in the documentation included here, as well as on the Tomcat web site: http://tomcat.apache.org

Tomcat can be stopped by executing the following commands on windows machine:

```
%CATALINA_HOME%\bin\shutdown

or

C:\apache-tomcat-5.5.29\bin\shutdown
```

Tomcat can be stopped by executing the following commands on Unix (Solaris, Linux, etc.) machine:

```
$CATALINA_HOME/bin/shutdown.sh

or

/usr/local/apache-tomcat-5.5.29/bin/shutdown.sh
```

FLEX - APPLICATIONS

Before we start with creating actual *HelloWorld* application using Flash Builder, let us see what are the actual parts of a Flex application. A Flex application consists of following four important parts out of which last part is optional but first three parts are mandatory:

- **Flex Framework Libraries**
- **Client-side code**
- **Public Resources (HTML/JS/CSS)**
- **Server-side code**

Sample locations of different parts of a typical Flex application **HelloWord** will be as shown below:

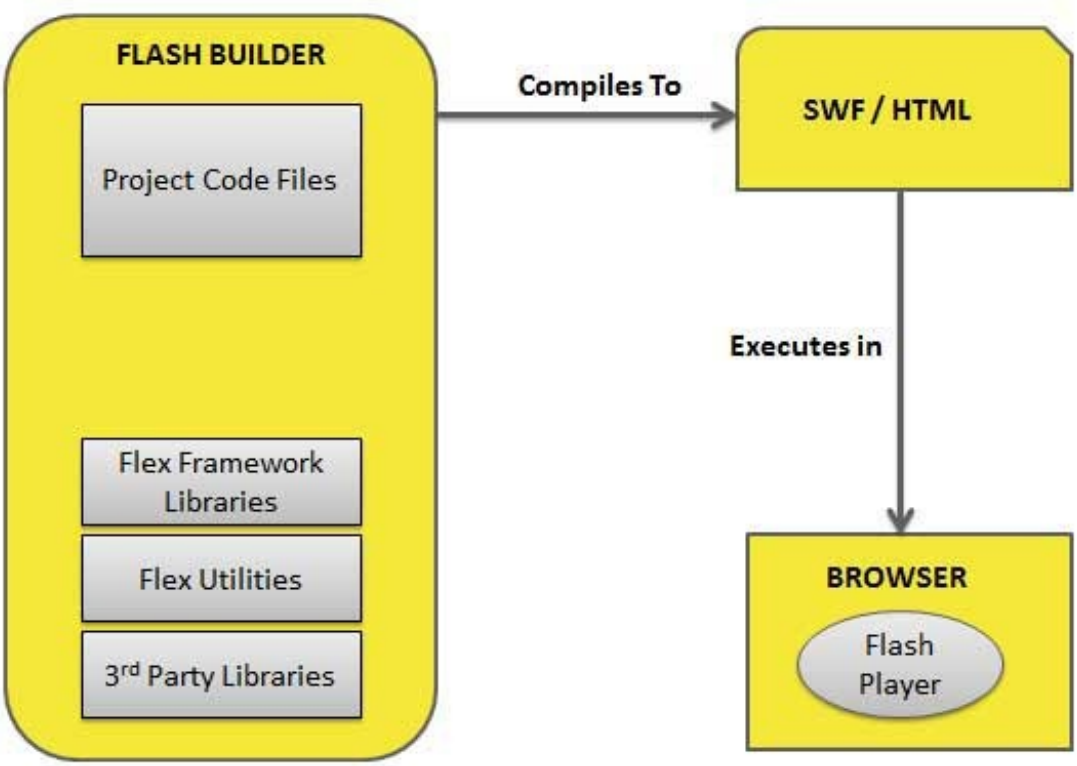
Name	Location
Project root	HelloWorld/
Flex Framework Libraries	Build Path
Public resources	html-template
Client-side code	src/com/tutorialspoint/client
Server-side code	src/com/tutorialspoint/server

Application Build Process

Flex application required Flex Framework libraries. Flash Builder automatically add the libraries to build path.

When we build our code using Flash Builder, Flash builder will do the following tasks

- Compiles the source code to HelloWorld.swf file.
- Compiles a HelloWorld.html (a wrapper file for swf file) from a file index.template.html stored in html-template folder
- Copies HelloWorld.swf and HelloWorld.html files in target folder, bin-debug.
- Copies swfobject.js, a javascript code responsible to load swf file dynamically in HelloWorld.html in target folder, bin-debug
- Copies framework libraries in form of swf file named frameworks_xxx.swf in target folder, bin-debug
- Copies other flex modules (.swf files such as sparkskins_xxx.swf,textLayout_xxx.swf) in target folder.



Application Launch Process

- Open the HelloWorld.html file available in \HelloWorld\bin-debug folder in any web-browser.
- HelloWorld.swf will load automatically and application will start running.

Flex Framework Libraries

Following is the brief detail about few important framework libraries.

In flex libraries are denoted using .swc notation

S.N.	Nodes & Description
1	**playerglobal.swc** This library is specific to FlashPlayer installed on your machine and contains native methods supported by flash player.
2	**textlayout.swc** This library supports the text layout related features.
3	**framework.swc** This is the flex framework library contains the core features of Flex.
4	**mx.swc** This library stores the definations of mx UI controls.
5	**charts.swc** This library supports the charting controls.
6	**spark.swc** This library stores the definations of spark UI controls.

7	**sparkskins.swc** This library supports the skinning of spark UI controls.

Client-side code

Flex application code can be written in MXML and ActionScript.

S.N.	Type & Description
1	**MXML** MXML is an XML markup language that we'll use to lay out user interface components.MXML is compiled into ActionScript during build process.
2	**ActionScript** ActionScript is an object-oriented procedural programming language and is based on the ECMAScript (ECMA-262) edition 4 draft language specification.

In Flex, we can mix ActionScript and MXML, to do the following:

- Lay out user interface components using MXML tags
- Use MXML to declaratively define nonvisual aspects of an application, such as access to data sources on the server
- Use MXML to create data bindings between user interface components and data sources on the server.
- Use ActionScript to define event listeners inside MXML event attributes.
- Add script blocks using the <mx:Script> tag.
- Include external ActionScript files.
- Import ActionScript classes.
- Create ActionScript components.

Public resources

These are helper files referenced by Flex application, such as Host HTML page, CSS or images located under html-template folder.It contains following files

S.N.	File Name & Description
1	**index.template.html** Host HTML page, with place holders. Flash Builder uses this template to build actual page HelloWorld.html with HelloWorld.swf file.
2	**playerProductInstall.swf** This is a flash utility to install Flash Player in express mode.
3	**swfobject.js** This is the javascript responsible to check version of flash player installed and to load HelloWorld.swf in

	HelloWorld.html page.
4	**html-template/history** This folder contains resources for history management of the application.

HelloWorld.mxml

This is the actual MXML/AS (ActionScript) code written implementing the business logic of the application and that the Flex compiler translates into SWF file which will be executed by flash player in the browser.A sample HelloWorld Entry class will be as follows:

```
<?xml version="1.0" encoding="utf-8"?>
<s:Application xmlns:fx="http://ns.adobe.com/mxml/2009"
   xmlns:s="library://ns.adobe.com/flex/spark"
   xmlns:mx="library://ns.adobe.com/flex/mx"
   width="100%" height="100%"
   minWidth="500" minHeight="500"
   initialize="application_initializeHandler(event)">

   <fx:Script>
      <![CDATA[
         import mx.controls.Alert;
         import mx.events.FlexEvent;
         protected function btnClickMe_clickHandler(event:MouseEvent):void
         {
            Alert.show("Hello World!");
         }

         protected function application_initializeHandler(event:FlexEvent):void
         {
            lblHeader.text = "My Hello World Application";
         }
      ]]>
   </fx:Script>
   <s:VGroup horizontalAlign="center" width="100%" height="100%"
   paddingTop="100" gap="50">
      <s:Label />
      <s:Button label="Click Me!"
      click="btnClickMe_clickHandler(event)" />
   </s:VGroup>
</s:Application>
```

Following Table gives the description of all the tags used in the above code script.

S.N.	Node & Description
1	**Application** Defines the Application container that is always the root tag of a Flex application.
2	**Script** Contains the business logic in ActionScript language.
3	**VGroup** Defines a Vertical Grouping Container which can contain Flex UI controls in vertical fashion.
4	**Label** Represents a Label control, a very simple user interface component that displays text.
5	**Button** Represents a Button control, which can be clicked to do some action.

Server-side code

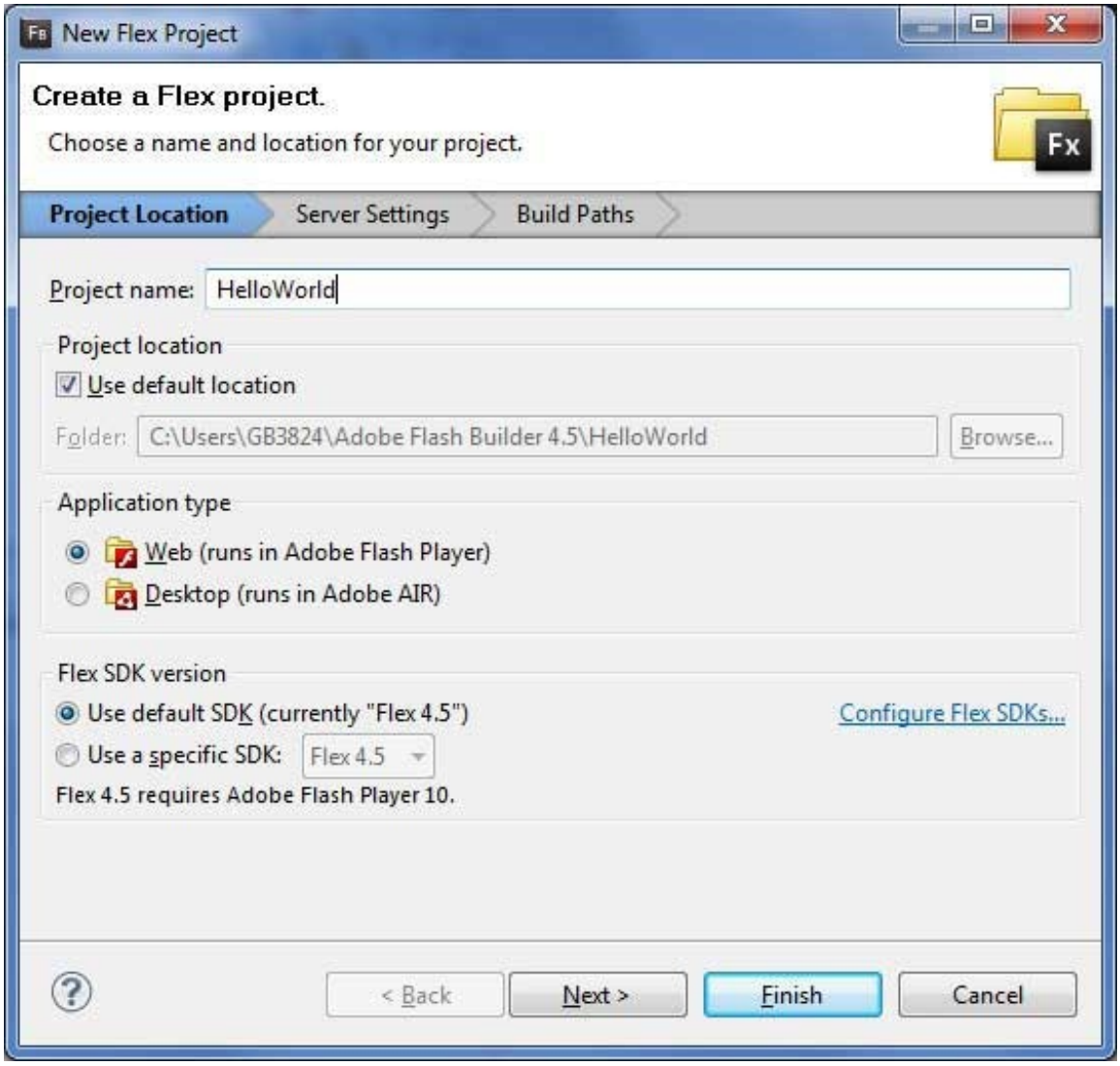
This is the server side part of your application and its very much optional. If you are not doing any backend processing with-in your application then you do not need this part, but if there is some processing required at backend and your client-side application interact with the server then you will have to develop these components.

FLEX - CREATE APPLICATION

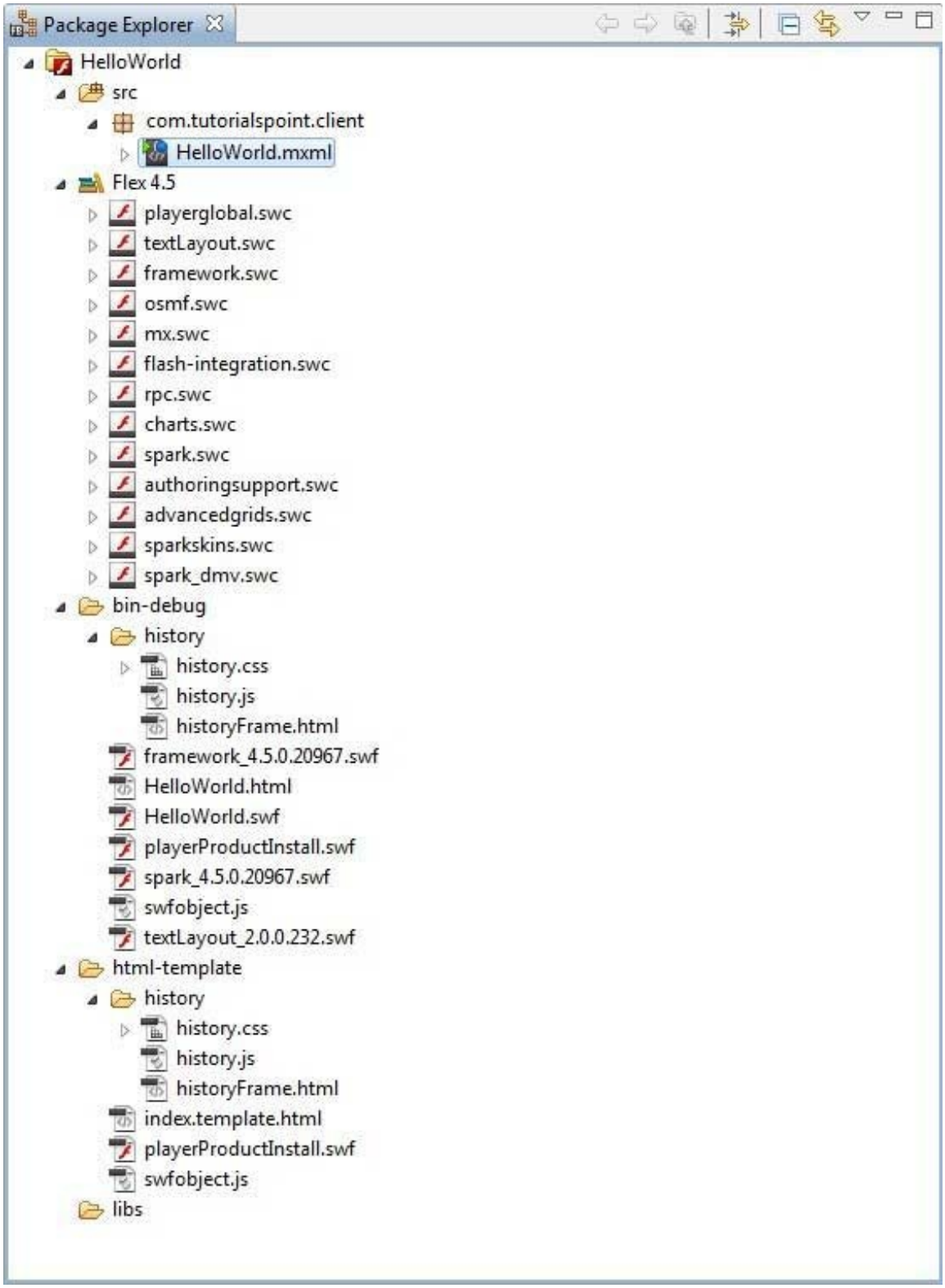
We'll use Flash Builder 4.5 to create Flex Applications. Let's start with a simple *HelloWorld* application:

Step 1 - Create Project

The first step is to create a simple Flex Project using Flash Builder IDE. Launch project wizard using the option **File > New > Flex Project**. Now name your project as *HelloWorld* using the wizard window as follows:



Select Application Type **Web (runs in Adobe Flash Player)** if not selected and leave other default values as such and click Finish Button. Once your project is created successfully, you will have following content in your Project Explorer:



Here is brief description of all important folders:

Folder	Location
src	• Source code (mxml / as classes) files. • We've created com/tutorialspoint/client folder structure containing the client-side specific java classes responsible for client UI display.
bin-debug	

bin-debug	• This is the output part, it represents the actual deployable web application. • history folder contains support files for history management of Flex application. • framework_xxx.swf, flex framework files to be used by flex application. • HelloWorld.html, wrapper/host HTML File for flex application. • HelloWorld.swf, our flex based application. • playerProductInstall.swf, flash player express installer. • spark_xxx.swf, library for spark component support. • swfobject.js, javascript responsible to load HelloWorld.swf in HelloWorld.html. It checks flash player version and passes initialization parameter to HelloWorld.swf file. • textLayout_xxx.swf, library for text component support.
html-template	• This represents the configurable web application. Flash Builder compiles files from html-template to bin-debug folder. • history folder contains support files for history management of Flex application. • index.template.html, wrapper/host HTML File for flex application having place holders for Flash Builder specific configuration. Gets compiled to HelloWorld.html in bin-debug folder during build. • playerProductInstall.swf, flash player express installer.Gets copied to bin-debug folder during build. • swfobject.js, javascript responsible to load HelloWorld.swf in HelloWorld.html. It checks flash player version and passes initialization parameter to HelloWorld.swf file.Gets copied to bin-debug folder during build.

Step 2 - Create external CSS file

Create a CSS file **styles.css** for Wrapper HTML page in **html-template** folder.

```
html, body  {
   height:100%;
}
body {
   margin:0;
   padding:0;
   overflow:auto;
   text-align:center;
}
object:focus {
   outline:none;
}
#flashContent {
   display:none;
}

.pluginHeader {
   font-family:Arial, Helvetica, sans-serif;
   font-size:14px;
   color:#9b1204;
```

```
   text-decoration:none;
   font-weight:bold;
}

.pluginInstallText {
   font-family:Arial, Helvetica, sans-serif;
   font-size:12px;
   color:#000000;
   line-height:18px;
   font-style:normal;
}

.pluginText {
   font-family:Arial, Helvetica, sans-serif;
   font-size:12px;
   color:#000000;
   line-height:18px;
   font-style:normal;
}
```

Step 3 - Modify Wrapper HTML page template

Modify Wrapper HTML page template **index.template.html** in **html-template** folder. Flash Builder will create a default Wrapper HTML page template *html-template/index.template.html*, which will be compiled to HelloWorld.html. This file contains placeholders which Flash Builder replaces during compilation process for example flash player version, application name etc.

Let us modify this file to display custom messages if flash plugin is not installed.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>${title}</title>
<meta name="google" value="notranslate" />
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<link rel="stylesheet" href="styles.css" type="text/css"></link>
<link rel="stylesheet" type="text/css" href="history/history.css" />
<script type="text/javascript" src="history/history.js"></script>
<script type="text/javascript" src="swfobject.js"></script>
<script type="text/javascript">
   // For version detection, set to min. required Flash Player version,
   //or 0 (or 0.0.0), for no version detection.
   var swfVersionStr = "${version_major}.${version_minor}.${version_revision}";
   // To use express install, set to playerProductInstall.swf,
   //otherwise the empty string.
   var xiSwfUrlStr = "${expressInstallSwf}";
   var flashvars = {};
   var params = {};
   params.quality = "high";
   params.bgcolor = "${bgcolor}";
   params.allowscriptaccess = "sameDomain";
   params.allowfullscreen = "true";
   var attributes = {};
   attributes.id = "${application}";
   attributes.name = "${application}";
   attributes.align = "middle";
   swfobject.embedSWF(
   "${swf}.swf", "flashContent",
   "${width}", "${height}",
   swfVersionStr, xiSwfUrlStr,
   flashvars, params, attributes);
   // JavaScript enabled so display the flashContent div in case
   //it is not replaced with a swf object.
   swfobject.createCSS("#flashContent", "display:block;text-align:left;");
</script>
</head>
<body>
<div >
```

```
   <p style="margin:100px;">
   <table  width="700" cellpadding="10" cellspacing="2" border="0">
      <tr><td >Flash Player Required</td></tr>
      <tr><td >The Adobe Flash Player version
      10.2.0 or greater is required.</td></tr>
      <tr><td class = "pluginInstallText" align="left">
         <table border="0" width="100%">
         <tr class = "pluginInstallText" >
         <td>Click here to download and install Adobe Flash Player:</td>
         <td> </td>
         <td align="right"> <script type="text/javascript">
         var pageHost
         =((document.location.protocol == "https:") ? "https://" : "http://");
         document.write("<a target='_blank'"
         +" href='http://get.adobe.com/flashplayer/'><"
         +"img style='border-style: none' src='"
         +pageHost
         +"www.adobe.com/images/shared/download_buttons/get_flash_player.gif'"
         +" alt='Get Adobe Flash player' /></a>" );
         </script>
         </td>
         </tr>
         </table>
         </td>
      </tr>
   </table>
   </p>
</div>
<noscript>
   <object class
   width="${width}" height="${height}" >
   <param name="movie" value="${swf}.swf" />
   <param name="quality" value="high" />
   <param name="bgcolor" value="${bgcolor}" />
   <param name="allowScriptAccess" value="sameDomain" />
   <param name="allowFullScreen" value="true" />
   <!--[if !IE]>-->
   <object type="application/x-shockwave-flash" data="${swf}.swf"
   width="${width}" height="${height}">
   <param name="quality" value="high" />
   <param name="bgcolor" value="${bgcolor}" />
   <param name="allowScriptAccess" value="sameDomain" />
   <param name="allowFullScreen" value="true" />
   <!--<![endif]-->
   <!--[if gte IE 6]>-->
   <p>
      <p style="margin:100px;">
      <table  width="700" cellpadding="10" cellspacing="2" border="0">
      <tr><td >Flash Player Required</td></tr>
      <tr><td >The Adobe Flash Player version
      10.2.0 or greater is required.</td></tr>
      <tr><td class = "pluginInstallText" align="left">
         <table border="0" width="100%">
         <tr class = "pluginInstallText" >
         <td>Click here to download and install Adobe Flash Player:</td>
         <td> </td>
         <td align="right"> <script type="text/javascript">
         var pageHost
         = ((document.location.protocol == "https:") ? "https://" : "http://");
         document.write("<a target='_blank'"
         +" href='http://get.adobe.com/flashplayer/'><"
         +"img style='border-style: none' src='"
         +pageHost
         +"www.adobe.com/images/shared/download_buttons/get_flash_player.gif'"
         +" alt='Get Adobe Flash player' /></a>" );
         </script>
         </td>
         </tr>
         </table>
         </td>
      </tr>
   </table>
   </p>
```

```
   </p>
   <!--<![endif]-->
     <p style="margin:100px;">
      <table  width="700" cellpadding="10" cellspacing="2" border="0">
      <tr><td >Flash Player Required</td></tr>
      <tr><td >The Adobe Flash Player version
      10.2.0 or greater is required.</td></tr>
      <tr><td class = "pluginInstallText" align="left">
         <table border="0" width="100%">
         <tr class = "pluginInstallText" >
         <td>Click here to download and install Adobe Flash Player:</td>
         <td> </td>
         <td align="right"> <script type="text/javascript">
         var pageHost
         = ((document.location.protocol == "https:") ? "https://" : "http://");
         document.write("<a target='_blank'"
         +" href='http://get.adobe.com/flashplayer/'><"
         +"img style='border-style: none' src='"
         +pageHost
         +"www.adobe.com/images/shared/download_buttons/get_flash_player.gif'"
         +" alt='Get Adobe Flash player' /></a>" );
         </script>
         </td>
         </tr>
         </table>
         </td>
      </tr>
   </table>
   </p>
   <!--[if !IE]>-->
   </object>
   <!--<![endif]-->
   </object>
</noscript>
</body>
</html>
```

Step 4 - Create internal CSS file

Create a CSS file **Style.css** for **HelloWorld.mxml** in **src/com/tutorialspoint** folder. Flex provides similar css styles for its UI Controls as there are css styles for HTML UI controls.

```
/* CSS file */
@namespace s "library://ns.adobe.com/flex/spark";
@namespace mx "library://ns.adobe.com/flex/mx";

.heading
{
   fontFamily: Arial, Helvetica, sans-serif;
   fontSize: 17px;
   color: #9b1204;
   textDecoration:none;
   fontWeight:normal;
}

.button {
   fontWeight: bold;
}

.container {
   cornerRadius :10;
   horizontalCenter :0;
   borderColor: #777777;
   verticalCenter:0;
   backgroundColor: #efefef;
}
```

Step 5 - Modify Entry Level Class

Flash Builder will create a default mxml file *src/com.tutorialspoint/HelloWorld.mxml*, which is having root tag <application> container for the application. Let us modify this file to display "Hello,World!":

```
<?xml version="1.0" encoding="utf-8"?>
<s:Application xmlns:fx="http://ns.adobe.com/mxml/2009"
   xmlns:s="library://ns.adobe.com/flex/spark"
   xmlns:mx="library://ns.adobe.com/flex/mx"
   width="100%" height="100%"
   minWidth="500" minHeight="500"
   initialize="application_initializeHandler(event)">
   <fx:Style source="/com/tutorialspoint/client/Style.css"/>
   <fx:Script>
      <![CDATA[
       import mx.controls.Alert;
       import mx.events.FlexEvent;
       protected function btnClickMe_clickHandler(event:MouseEvent):void
       {
          Alert.show("Hello World!");
       }

       protected function application_initializeHandler(event:FlexEvent):void
       {
          lblHeader.text = "My Hello World Application";
       }
      ]]>
   </fx:Script>
   <s:BorderContainer width="500" height="500"
      styleName="container">
      <s:VGroup width="100%" height="100%" gap="50" horizontalAlign="center"
         verticalAlign="middle">
         <s:Label
            styleName="heading"/>
         <s:Button label="Click Me!"
            click="btnClickMe_clickHandler(event)" styleName="button" />
      </s:VGroup>
   </s:BorderContainer>
</s:Application>
```

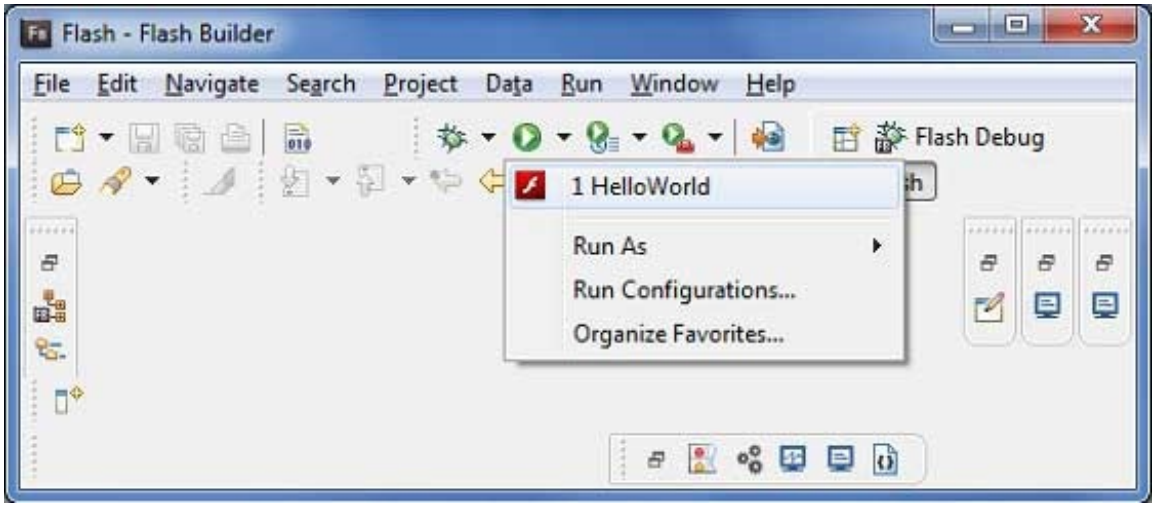
You can create more mxml or actionscript files in the same source directory to define either new applications or to define helper routines.

Step 6 - Build Application

Flash Builder has **Build Automatically** by default checked. Just check the **Problems** View if there is any error. Once you are done with the changes, you will not see any errors.

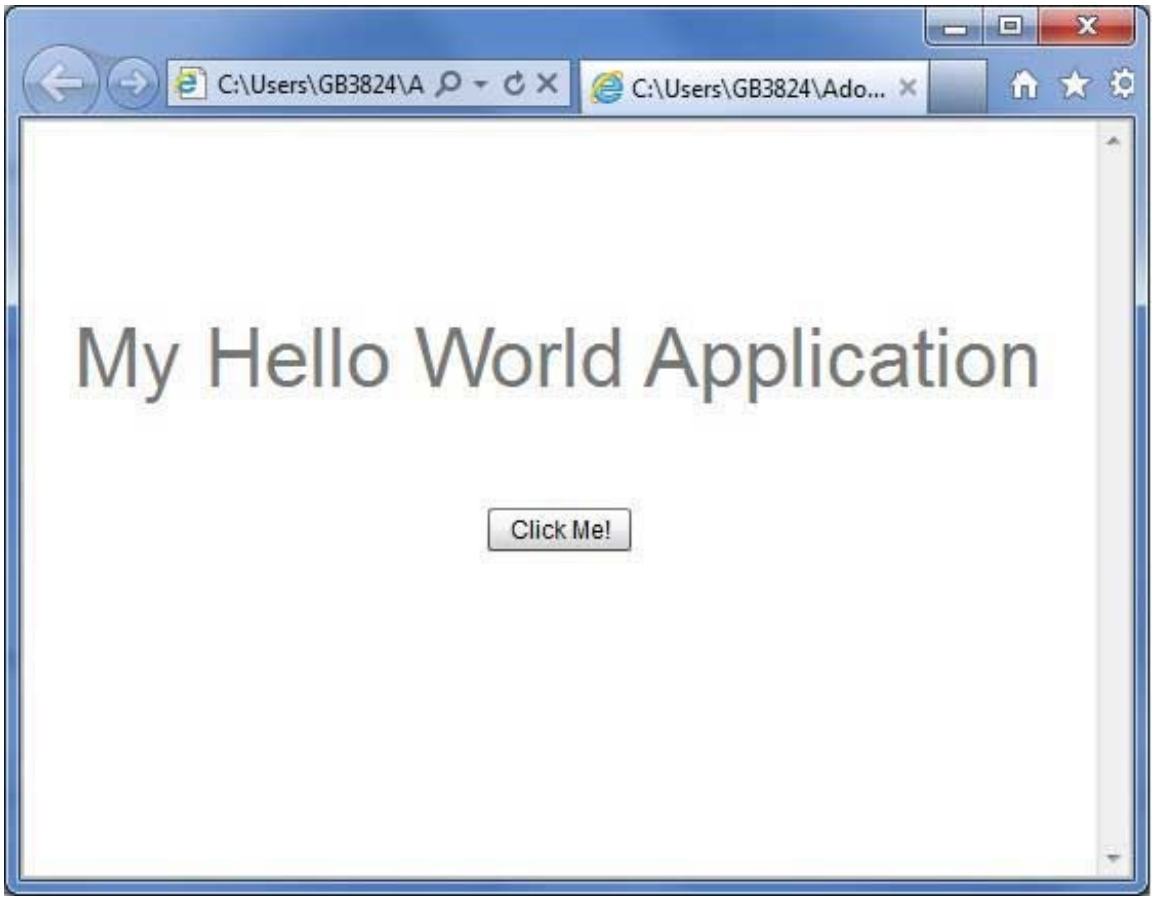
Step 7 - Run Application

Now click on Run application menu and select **HelloWorld** application to run the application.



If everything is fine, you must see browser pop up and application up and running. If everything is fine with your application, this will produce following result: [Try it online]

Because you are running your application in flash player, so you will need to install Flash Player plugin for your browser. Simply follow the onscreen instructions to install the plugin. If you already have Flash Player plugin set for your browser, then you should be able to see the following output:



Congratulations! you have implemented your first application using Flex.

FLEX - DEPLOY APPLICATION

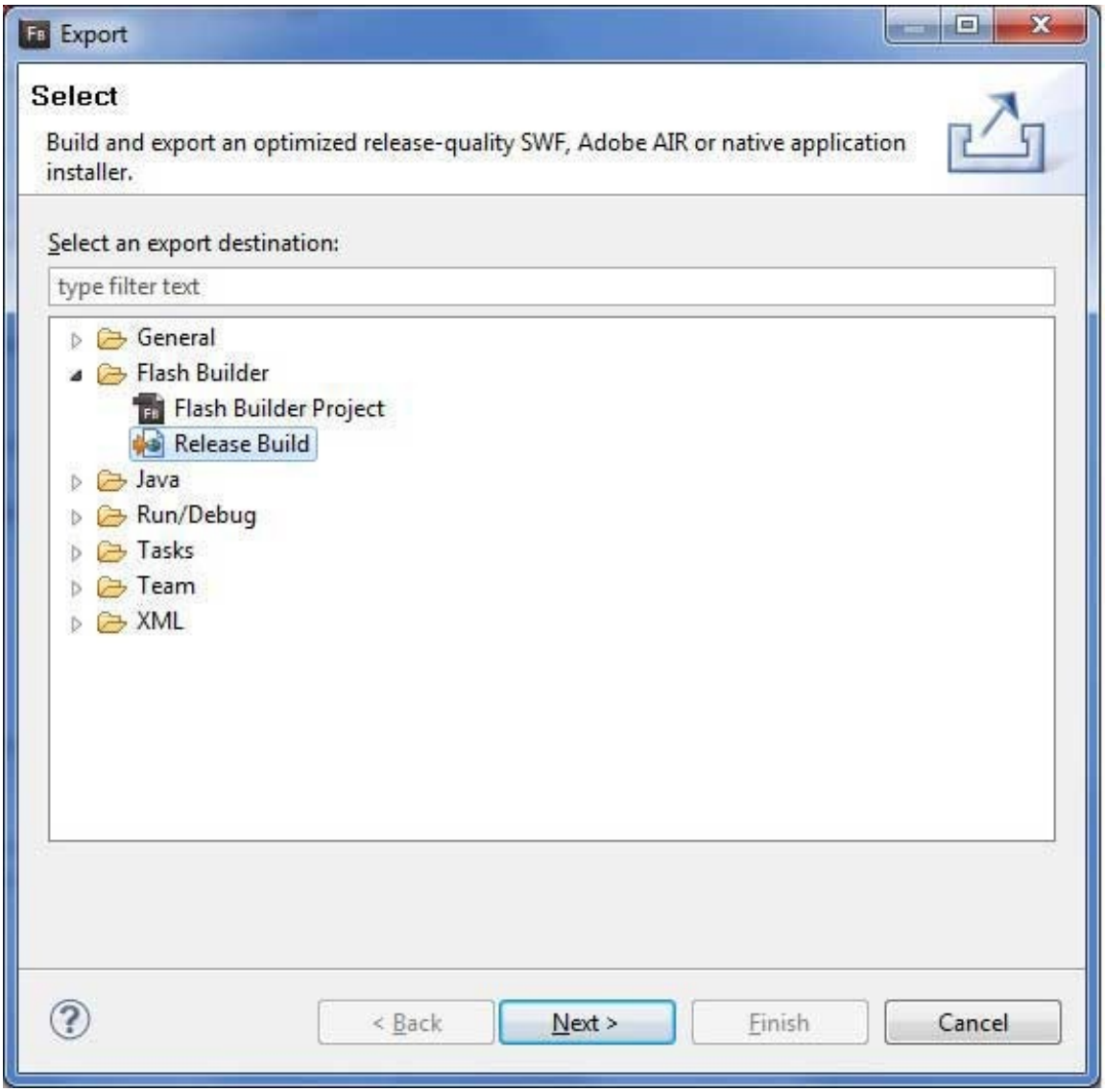
This section will explain you how to create an application **war** file and how to deploy that in Apache Tomcat Websever root. If you understood this simple example then you will also be able to deploy a complex Flex application following the same steps.

Let us follow the following steps to create a Flex application:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint.client* as explained in the *Flex - Create Application* chapter.
2	Modify *HelloWorld.mxml* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to make sure business logic is working as per the requirements.

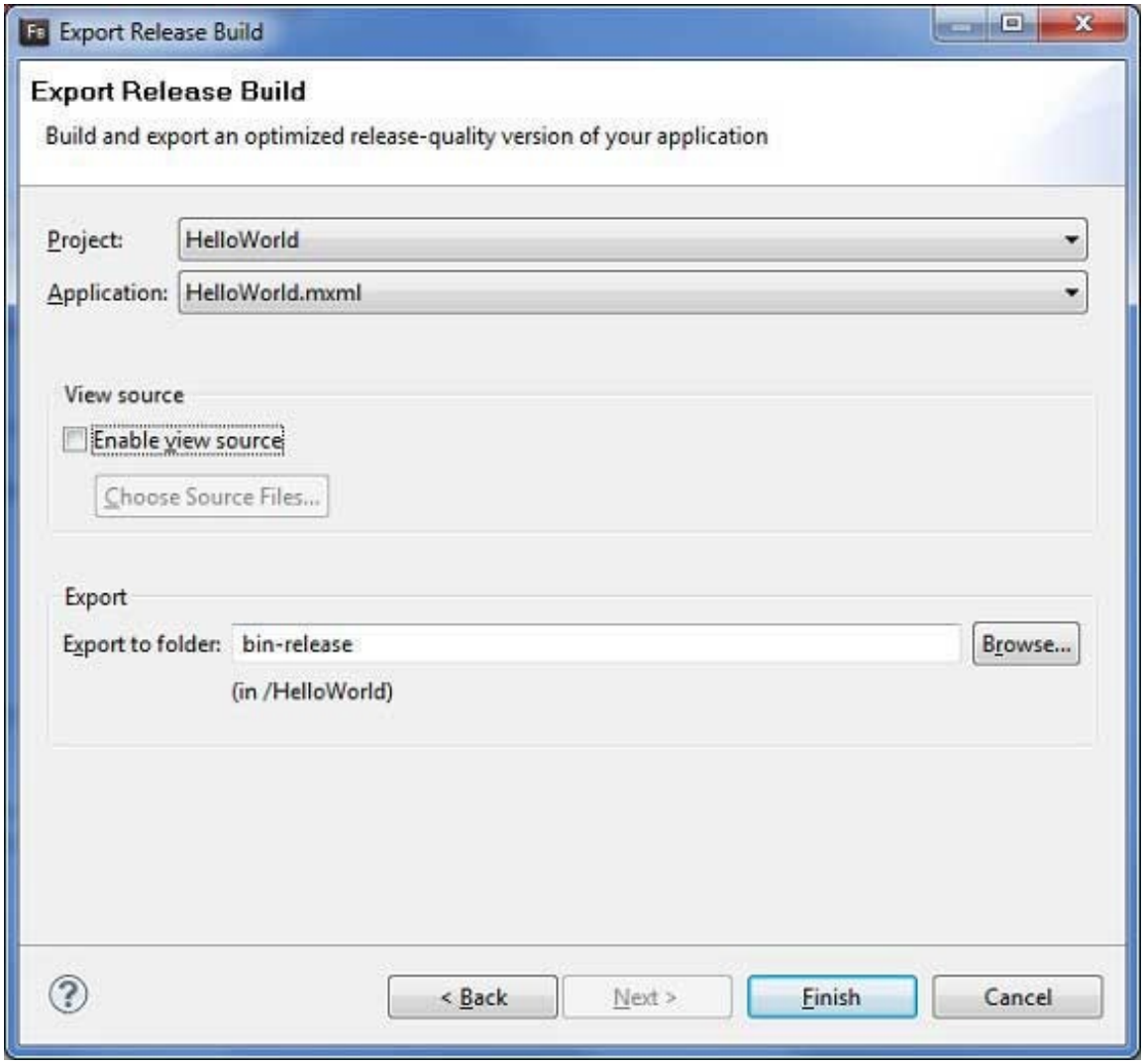
Follow the following steps to create a release build of a Flex application and then deploy it to tomcat server:

The first step is to create a release build using Flash Builder IDE. Launch release build wizard using the option **File > Export > Flash Builder > Release Build**



.

Select project as *HelloWorld* using the wizard window as follows



Leave other default values as such and click Finish Button. Now Flash Builder will create a bin-release folder containing the project's release build.

Now our release build is ready ,let us follow the following steps to deploy a Flex application:

Step	Description
1	Zip the content of the **bin-release** folder of the application in the form of HelloWorld.war file and deploy it in Apache Tomcat Webserver.
2	Launch your web application using appropriate URL as explained below in the last step.

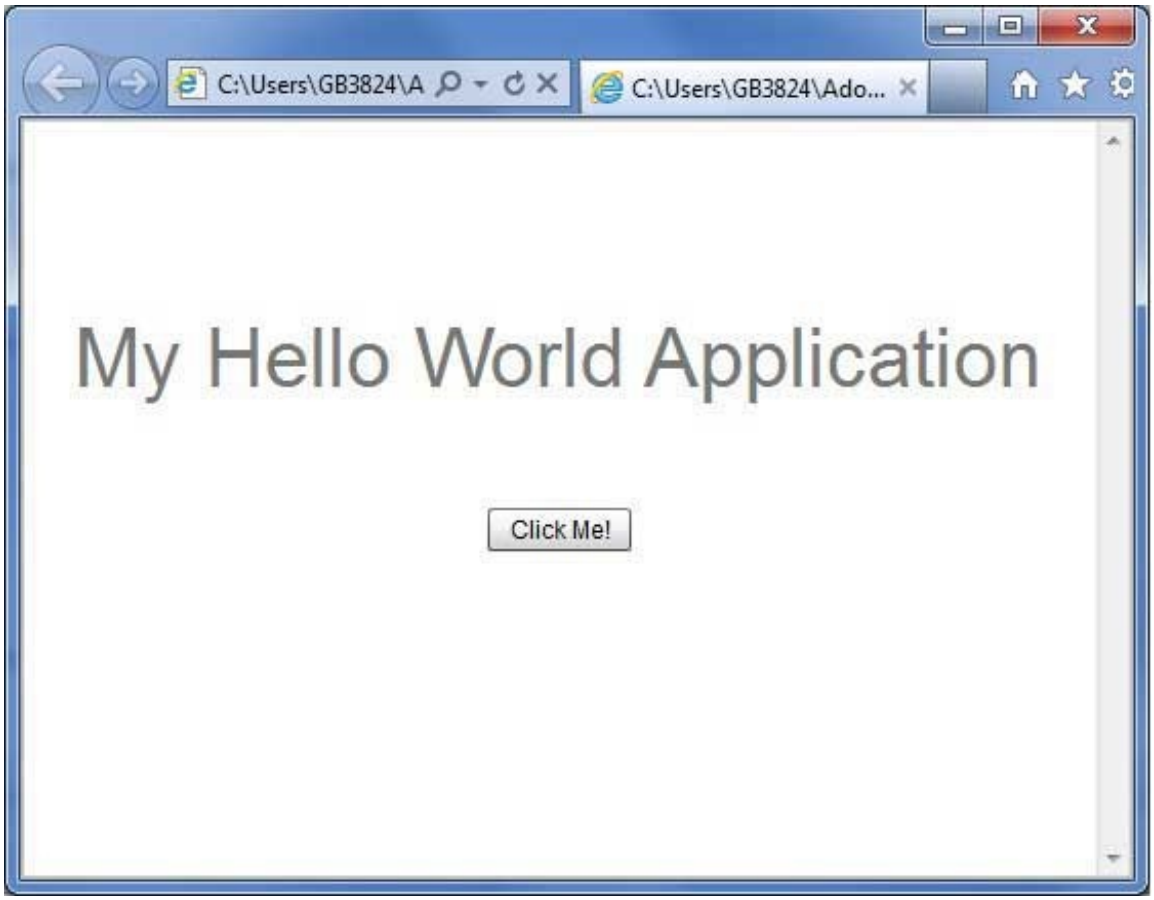
Following is the content of the modified mxml file **src/com.tutorialspoint/HelloWorld.mxml**.

```
<?xml version="1.0" encoding="utf-8"?>
<s:Application xmlns:fx="http://ns.adobe.com/mxml/2009"
   xmlns:s="library://ns.adobe.com/flex/spark"
   xmlns:mx="library://ns.adobe.com/flex/mx"
   width="100%" height="100%"
   minWidth="500" minHeight="500"
   initialize="application_initializeHandler(event)">
   <fx:Style source="/com/tutorialspoint/client/Style.css"/>
   <fx:Script>
      <![CDATA[
         import mx.controls.Alert;
         import mx.events.FlexEvent;
```

```
         protected function btnClickMe_clickHandler(event:MouseEvent):void
         {
            Alert.show("Hello World!");
         }

         protected function application_initializeHandler(event:FlexEvent):void
         {
            lblHeader.text = "My Hello World Application";
         }
      ]]>
   </fx:Script>
   <s:BorderContainer width="500" height="500"
      styleName="container">
      <s:VGroup width="100%" height="100%" gap="50" horizontalAlign="center"
         verticalAlign="middle">
         <s:Label
            styleName="heading"/>
         <s:Button label="Click Me!"
            click="btnClickMe_clickHandler(event)" styleName="button" />
      </s:VGroup>
   </s:BorderContainer>
</s:Application>
```

Once you are ready with all the changes done, let us compile and run the application in normal mode as we did in Flex - Create Application chapter. If everything is fine with your application, this will produce following result: [Try it online]



Create WAR File

Now our applictaion is working fine and we are ready to export it as a war file. Follow the following steps:

- Go into your project's **bin-release** directory **C:\workspace\HelloWorld\bin-release**
- Select all the files & folders available inside bin-release directory.

- Zip all the selected files & folders in a file called *HelloWorld.zip*.
- Rename *HelloWorld.zip* to *HelloWorld.war*.

Deploy WAR file

- Stop the tomcat server.
- Copy the *HelloWorld.war* file to **tomcat installation directory > webapps folder.**
- Start the tomcat server.
- Look inside webapps directory, there should be a folder **HelloWorld** got created.
- Now HelloWorld.war is successfully deployed in Tomcat Webserver root.

Run Application

Enter a url in web browser: **http://localhost:8080/HelloWorld/HelloWorld.html** to launch the application

Server name (localhost) and port (8080) may vary as per your tomcat configuration.